

MAR 13 2007

Application No.: 10/800,168

Docket No.: TOW-068

REMARKS

Applicants amend claims 1, 5 and 8, and add new method claims 9-16. Claims 1-16 are pending, of which claims 1, 5, 9 and 13 are independent. No new matter has been introduced.

New claims 9-12 are method claims that parallel claims 1-4, and new claims 13-16 are method claims that parallel claims 5-8. Support for the claim amendments can be found throughout the specification, and at least in Figures 1 and 5-7 and related text. Applicants respectfully submit that the pending claims define over the art of record.

Objection to the Drawings

The drawings are objected to under 37 CFR 1.83(a) because they fail to show the outlet of the cathode [25] in Figure 1. Applicants amend the Specification at page 7, line 26 to recite "outlet of the cathode 26," rather than "outlet of the cathode 25." Applicants respectfully request the Examiner to reconsider and to withdraw the objection to the drawings.

The Claimed Invention

The present invention is generally directed to a humidity sensor which is disposed in a circulation passage that supplies hydrogen gas to an anode of a fuel cell stack. A load current setting unit determines a level of electrical current supplied to a load. A flow rate controller controls a compressor based on the humidity detected by the humidity sensor and the load current to regulate a flow rate of the air supplied to a cathode of the fuel cell stack for maintaining the humidity of the hydrogen gas within a predetermined range.

The fuel cell system maintains the humidity of the hydrogen gas without requiring a dedicated humidifier for humidifying the hydrogen gas supplied to the anode. Humidification of the hydrogen gas without the use of a dedicated humidifier minimizes wasteful discharge of the hydrogen gas to the outside.

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Rejection of Claims 1 and 5 under 35 U.S.C. §102

Claims 1 and 5 are rejected under 35 U.S.C. §102(b) as being anticipated by United States Patent Publication No. 2001/0010875 to Katagiri et al ("Katagiri"). Applicants respectfully submit that the Katagiri reference does not disclose that the "fuel cell system is free of a humidifier for humidifying said hydrogen-containing gas supplied to said anode of said fuel cell," as recited in amended independent claims 1 and 5.

The Katagiri reference is generally directed to a humidification system for humidifying a fuel cell. The system includes a water-permeable-type humidifier for humidifying reaction gas used in reaction with moisture in exhaust gas exhausted after the reaction. The system also includes an adjuster for adjusting an amount of humidification to the humidification amount required by the fuel cell. See Katagiri, abstract.

Applicants respectfully submit that the Katagiri reference does not disclose that the "fuel cell system is free of a humidifier for humidifying said hydrogen-containing gas supplied to said anode of said fuel cell," as recited in claims 1 and 5. In connection with Figure 1, the reference states: "The gas used in the reaction in the fuel cell 1 is oxygen in the supplied air, or separately supplied hydrogen. The humidifier 6 for humidifying the air which is the reaction gas with the moisture in the exhaust gas is provided between the reaction gas supply passage 3 and the exhaust gas discharge passage 5." See Katagiri, paragraphs [0038-0039]. In the Katagiri reference, humidification of a reaction gas, like hydrogen, is accomplished by a humidifier. The reference fails to disclose a fuel cell system free of a humidifier on the anode side, while employing a humidifier on the cathode side.

In light of the foregoing arguments, Applicants respectfully submit that the Katagiri reference does not disclose each and every element of independent claims 1 and 5. Applicants respectfully request that the 35 U.S.C. §102(b) rejection of claims 1 and 5 in view of the Katagiri reference be withdrawn. Reconsideration and allowance of claims 1 and 5 is requested in view of the above remarks.

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Rejection of Claims 1-8 under 35 U.S.C. §103

Claims 1-8 are rejected under 35 U.S.C. §103(a) as being unpatentable over United States Patent Publication No. 2002/0164509 A1 to Wheat et al ("Wheat") in view of United States Patent Publication No. 2002/0006537 to Kobayashi et al ("Kobayashi"). Applicants respectfully submit that the Wheat and Kobayashi references, alone or in combination, do not teach or suggest that the "fuel cell system is free of a humidifier for humidifying said hydrogen-containing gas supplied to said anode of said fuel cell," as recited in amended independent claims 1 and 5.

The Wheat reference is generally directed to a humidity control system for a fuel cell stack including a gas supply and a humidifier including an outlet and an inlet connected to that gas supply. A fuel cell stack includes an inlet that is connected to the outlet of the humidifier. A bypass line and a valve bypass gas around the humidifier to control the humidity of gas entering the fuel cell stack. See Wheat, abstract.

Applicants respectfully submit that the Wheat reference fails to teach or suggest that the "fuel cell system is free of a humidifier for humidifying said hydrogen-containing gas supplied to said anode of said fuel cell," as recited in claims 1 and 5. The Wheat reference states: "The humidity control system of the present invention employs a bypass line and a valve to bypass gas around the humidifier. Bypassing more gas reduces the humidity of the gas.... The gas is hydrogen or reformat that is supplied to an anode flow line or air or oxygen that is supplied to a cathode flow line." See Wheat, paragraph [0019]. For humidification of the hydrogen gas supplied to the anode, the Wheat apparatus relies on passing the hydrogen gas through the humidifier. Thus, the Wheat reference teaches humidification of hydrogen gas by passing the gas through a humidifier. In contrast, claims 1 and 5 require humidification of hydrogen without the use of a humidifier on the anode side, while humidifying oxygen-containing gas with a humidifier. Thus, the Wheat reference fails to teach or suggest the aforementioned features of claims 1 and 5.

Furthermore, Applicants contend that there is no motivation to modify the Wheat apparatus to implement the apparatus of claims 1 and 5, since such a modification would require elimination of the anode-side humidifier which forms the basis of humidification in the Wheat reference. The addition of the Kobayashi reference fails to cure this deficiency.

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The Kobayashi reference is generally directed to a gas-supplying apparatus in a fuel cell including a compressor which sucks a supply gas to be supplied to a fuel cell downstream of the fuel cell. The gas-supplying apparatus includes a heat exchanger which performs heat exchange between the supply gas and the exhaust gas. See Kobayashi, abstract.

Applicants respectfully submit that the Kobayashi reference also fails to teach or suggest that the "fuel cell system is free of a humidifier for humidifying said hydrogen-containing gas supplied to said anode of said fuel cell," as recited by claims 1 and 5. The Kobayashi reference is directed to a gas-supplying apparatus, and is silent on the humidification of hydrogen-containing gas supplied to the anode of the fuel cell. Thus, Applicants respectfully submit that the Kobayashi reference does not teach or suggest the aforementioned feature of claims 1 and 5. Furthermore, the reference provides no motivation to modify the Kobayashi apparatus to implement humidification of hydrogen-containing gas without the use of a humidifier as required by claims 1 and 5.

In light of the foregoing arguments, Applicants respectfully submit that the Wheat and Kobayashi references, alone or in combination, do not teach or suggest each and every element of independent claims 1 and 5. Applicants respectfully request that the 35 U.S.C. 103(a) rejection of claims 1 and 5 in view of the Wheat and Kobayashi references be withdrawn. Reconsideration and allowance of claims 1 and 5 is requested in view of the above remarks.

Claims 2-4 depend upon claim 1 and add separate and patentable limitations to claim 1. Claims 6-8 depend upon claim 5 and add separate and patentable limitations to claim 5. As such, for this and the reasons set forth above, Applicants respectfully submit that the dependent claims also define over the art of record.

New Claims

New claims 9-16 contain similar limitations and hence are not anticipated or rendered obvious by the Katagiri, Wheat and Kobayashi references, alone or in combination. In light of the foregoing arguments, Applicants respectfully submit that new claims 9-16 are patentable over the cited references.

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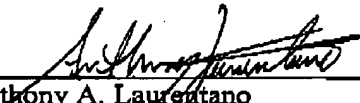
CONCLUSION

In view of the foregoing amendments, Applicants believe the pending application is in condition for allowance.

Applicants believe that no fee is due with this statement. However, if a fee is due, please charge our Deposit Account No. 12-0080, under Order No. TOW-068 from which the undersigned is authorized to draw.

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Respectfully submitted,

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